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EARTH'S FINAL FRONTIER:

A U.S. STRATEGY FOR OCEAN EXPLORATION

The Report of the President's Panel for Ocean Exploration

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LETTER OF TRANSMITTAL

Secretary of Commerce, Norman Y. Mineta

October 10, 2000

To the President:

On June 12, 2000, at the Millenium Council presentation "Under the Sea, Beyond the Stars," you ushered in a new era of Ocean Exploration by directing the Secretary of Commerce to convene a panel of America's finest ocean explorers, scientists, and marine educators. You called on the nation's best people to develop a national strategy for ocean exploration.

Your challenge has been met by the Ocean Exploration Panel. Members of the Panel represented the full array of ocean interests, including industry, conservation, educators, academia, and government, who worked together to create this crucial strategy. I am pleased to present their report, "Discovering Earth's Final Frontier: A U.S. Strategy for Ocean Exploration."

Our nation's history, from colonization and westward expansion to the deployment of the Hubble telescope, is testament to the fact that America is a country of explorers. Our pride as a nation is founded upon our yearning to make new discoveries and to seek out new knowledge. Exploration of the oceans responds to a growing national interest in our seas and an acknowledgement of their importance to our environment and quality of life.

We are growing in the awareness that the ocean influences our daily lives in hundreds of ways. From providing fisheries resources or cures for disease, to unlocking the secrets of long-term climate, we are constantly reminded of the ocean's importance in sustaining life. Truly, our economic, environmental, and national security depend on our ability to understand the ocean frontier, as well as balancing the competing interests of conservation and economics.

Within the Department of Commerce, we have had over 30 years experience in managing the conservation, sustainable use, and commercial aspects of our oceans. For this reason, I am proud to offer the National Oceanic and Atmospheric Administration as the lead agency for new national efforts in ocean exploration.

For too long, our natural resource agencies have pursued a course of ocean resource management rather than ocean exploration. We now know the futility of trying to manage systems without complete knowledge of them. This report outlines a coordinated, focused approach that will ensure a better understanding of the oceans for generations to come.

This report envisions a new collaboration among governments, academia, and private industry that reaches out to everyone and marks a turning point for exploration. May it also mark a new era of ocean stewardship.

Norman Y. Mineta
Secretary of Commerce

EXECUTIVE SUMMARY

WITHIN *the past few decades, advances in undersea technology have revolutionized the way we think about the oceans and the life within them.*

New exploration tools can place researchers into the deepest reaches of the oceans, either directly or by telepresence. Hundreds of new marine species and entirely new ecosystems have been discovered. The benefit attributed to these advances has been enormous; for example, a new industry, marine biotechnology, has shown impressive returns. Understanding biodiversity of the oceans is critical to sustaining their immense global economic value. Furthermore, the deep oceans may hold the keys to the origin of life itself. Despite these gains, 95 percent of the oceans remain unknown and unexplored.

On June 12, 2000, President Clinton announced the commencement of a new era of ocean exploration. In an Executive Directive to the Secretary of Commerce, the President requested that the Secretary convene a panel of leading ocean explorers, scientists, and educators to develop a national strategy for exploring the oceans. The Panel has completed its work and presents its recommendations for a national strategy in this report.

The Panel recommends that the U.S. undertake a national program in ocean exploration in which discovery and the spirit of challenge are the cornerstones. Multidisciplinary exploration approaches, covering all three dimensions of space, as well as the fourth dimension of time, should include natural and social sciences as well as the arts. The U.S. Ocean Exploration Program should be global in scope, but concentrated initially in areas under U.S. jurisdiction. Results must be carefully documented and widely disseminated; the program must be innovative and bold.

The President requested objectives and priorities to guide ocean exploration, as well as identification of key sites of scientific, historic, and cultural importance. The Panel identified the following key objectives of an Ocean Exploration Program:

1 |
Mapping the physical, geological, biological, chemical, and archaeological aspects of the ocean, such that the U.S. knowledge base is capable of supporting the large demand for this information from policy makers, regulators, commercial ventures, researchers, and educators;

2 |
Exploring ocean dynamics and interactions at new scales, such that our understanding of the complex interactions in the living ocean supports our need for stewardship of this vital component of the planet's life support system;

3 |
Developing new sensors and systems for ocean exploration, so as to regain U.S. leadership in marine technology; and

4 |
Reaching out in new ways to stakeholders, to improve the literacy of learners of all ages with respect to ocean issues.

The Panel notes that the United States currently does not support a program in ocean exploration, despite our inadequate understanding of the ocean and the living and nonliving resources it contains, and its undeniable importance to the health of the planet and the wealth of our nation. Furthermore, in a number of areas, the U.S. has fallen behind other nations in our capabilities for undertaking ocean exploration. American leadership in ocean exploration can be achieved through the following recommendations.

The U.S. government should establish an Ocean Exploration Program for an initial period of 10 years, with new funding at the level of $75M/year, excluding capitalization costs. The program should include:

— ***Interdisciplinary voyages of discovery within high-priority areas, including the U.S. Exclusive Economic Zone (EEZ) and the continental margin, the Arctic, and poorly known areas of the southern oceans and inland seas. The U.S. inventory of the living and nonliving resources in the ocean should be second to none, particularly within our own EEZ and continental margins.***

— ***Platform, communication, navigation and instrument development efforts, including the capitalization of major new assets for ocean exploration, in order to equip our explorers with the very best in marine research technology.***

— ***Data management and dissemination, so that discoveries can have maximum impact for research, commercial, regulatory, and educational benefit.***

— ***Educational outreach, in both formal and informal settings, to improve the science competency of America's schoolchildren and to realize the full potential of a citizenry aware and informed of ocean issues.***

Partnerships are essential if the full benefits of ocean exploration are to be realized. Mechanisms must be developed for forming appropriate partnerships between federal, state, local, and tribal governments, industry, academic institutions, formal and informal educators, mass media and nongovernmental organizations. These partnerships will greatly expand the opportunities to undertake voyages of discovery, technology development, and educational outreach. The Panel recognizes that the framework for accommodating collaboration in ocean exploration depends upon its broader organizational strategy. Therefore, recommendations concerning partnerships must also consider larger organizational issues.

The President of the United States should instruct the White House Science Advisor and appropriate Cabinet officials to design the management structure for this program. Elements of governance should include:

— ***Designating a lead agency to be in charge of the program and accountable for its success using benchmarks appropriate for ocean exploration, such as the number of new discoveries, dissemination of data, and the impact of educational outreach.***

— ***Using existing interagency mechanisms to ensure federal cooperation among agencies.***

— ***Establishing an Ocean Exploration Forum that would include commercial, academic, private, and nongovernmental organizations, and government stakeholders in ocean exploration, to encourage partnerships and promote communication.***

New technologies will enable the next generation of ocean exploration, but if the U.S. is to be a leader in this area, we must make a commitment to provide the very best technology. Of particular importance are the development of: ***1)*** Underwater navigation and communication technologies; ***2)*** State-of-the-art sensors; and ***3)*** Deployment strategies for multidisciplinary, in-situ and remote-sensing measurements of biological, chemical, physical and geological processes at all levels in the ocean. Therefore, recommendations concerning new technologies must consider:

— ***Undertaking the development of underwater platforms, communication systems, navigation, and a wide range of sensors, including the capitalization of major new assets for ocean exploration.***

The Panel was also charged with recommending mechanisms to ensure that information gathered through ocean exploration is referred to the newly established Marine Protected Areas Center and to appropriate commercial interests for possible

research and development. The President can ensure that knowledge gathered during ocean exploration is effectively made available for informed decision-making relative to Marine Protected Areas by:

— ***Assigning leadership in this activity to an appropriate federal agency.***

— ***Establishing a broad-based task force to design and implement an integrated, workable, and comprehensive data management information processing system for information on unique and significant features.***

With respect to assuring that potential opportunities for developing new resources into useful products to benefit mankind are encouraged, the Panel recommends that U.S. laws be re-examined to provide proper incentives for potential commercial users of ocean discoveries. Examples of some areas in which policies could encourage the appropriate use of exploration results include:

— ***Enhancing funding within federal agencies to support early-phase research on discoveries with commercial potential.***

— ***Providing incentives to private industry to encourage the funding of research and development of discoveries with commercial potential.***

— ***Designing mechanisms whereby those who directly profit from the exploitation of marine resources support research on their environmentally sustainable use.***

The Panel advocates a new national Ocean Exploration Program to permit exploratory expeditions for two reasons: ***1)*** The initial phase of oceanographic discovery ended before a significant portion of the oceans was visited in even a cursory sense; and ***2)*** Marvelous new tools now exist that permit exploration in spatial and temporal dimensions that were unachievable 50 years ago. For these reasons, we must go where no one has ever gone before, "see" the oceans through a new set of technological "eyes," and record these journeys for posterity.